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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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FISH & RICHARDSON PC P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			EXAMINER PARSONS, THOMAS H	
			ART UNIT 1745	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/616,495

Applicant(s)

BOURILKOV ET AL.

Examiner

Thomas H. Parsons

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 April 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 26-35 is/are pending in the application.
- 4a) Of the above claim(s) 5-9 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 26-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after allowance or after an Office action under *Ex Parte Quayle*, 25 USPQ 74, 453 O.G. 213 (Comm'r Pat. 1935). Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on 23 July 2007 has been entered.

Election/Restrictions

2 Applicant's election with traverse of Group I, claims 1-4 and 5-9 in the reply filed on 17 April 2006 is acknowledged. The traversal is on the grounds that the Examiner has not shown that the subcombination has a separate utility. The combination as claimed does not require the particulars of the Subcombination as claimed because the subcombination requires a member including appropriate mating fitting that is not required in the combination. The combination requires only the interface in combination with, for example, a converter. The subcombination (i.e. the adapter) has separate utility such as a battery charger in the absence of an interface, a fuel cell or a converter. The requirement is still deemed proper and is therefore made Final. ***Therefore, claims 5-9 are withdrawn from consideration. The cancellation of claims 10-25 in the Amendment filed 31 July 2006 is acknowledged.***

Claim Objections

3. Claims 26 and 31 are objected to because of the following informalities:

Claim 26, lines 1 and 2, suggest changing "comprises" to --comprising--.

Claim 31, line 1, suggest changing "comprises" to --comprising--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 31-35 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 31 recites the limitation "the interface" in line 8. There is insufficient antecedent basis for this limitation in the claim. Claims 32-35 are rejected because they are dependent upon claim 31.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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7. Claims 26-28, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bean et al. (6,955,863) in view of Droppo et al. (6,628,011).

Claim 26: Bean et al. in Figures 2, 3A and 11 disclose a hybrid power supply comprises:

an adapter comprising: a member including appropriate mating fittings (110, 112) to allow the member to connect to a battery (102) or a source of fuel (104) for a fuel cell system for powering an electronic device (101, 240) and; a switching type DC/DC boost type converter (230) coupled to the member (100, 202) and which receives energy from a fuel cell (104, 220) or from an external battery connected to the member (col. 3: 33-47, col. 4: 13-35, col. 10: 3-10, and 64-67).

Bean et al. do not disclose a switching type DC/DC boost type converter that is arranged to deliver the energy to a rechargeable cell, the DC/DC converter configured to provide substantially constant current drain from the fuel cell.

Droppo et al. in Figures 2-4 disclose a switching type DC/DC boost type converter (14) that is arranged to deliver the energy to a rechargeable cell (25), the DC/DC converter configured to provide substantially constant current drain from the fuel cell (col. 2: 28-col. 4: 35). The configuration of the converter is similar to that instantly disclosed, and, therefore, would obviously provide substantially constant current drain from the fuel cell.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified apparatus of Bean et al. by substituting the booster with the booster and rechargeable battery of Droppo et al. because Droppo et al. teach a booster in combination with a rechargeable battery that would have provided a

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power management system that manages power flow to and from multiple, isolated DC power sources and energy storage devices while delivering high quality alternating power to a load thereby improving the overall energy conversion of the apparatus.

Claim 27: The rejection is as set forth above in claim 26 wherein further Droppo et al. disclose a circuit (12) disposed to sense when a voltage is present across terminals of the member interface to cause power to be supplied to rechargeable battery from an external battery when the external battery is present or from a fuel cell when the battery is not present (col. 2: 55-65).

Claim 28: The rejection is as set forth above in claim 26 wherein further Droppo et al. in Figure 4 disclose that the circuit includes a diode (Da) coupled between an output terminal of the fuel cell and a terminal of the member that connects an external battery to the hybrid supply (col. 4: 1-35).

Claim 30: The rejection is as set forth above in claim 26 wherein further Droppo et al. disclose a circuit including a fuel cell current control (22) that senses fuel cell current and controls in part operation of the converter to provide constant current discharge on the fuel cell side of the hybrid power supply (col. 2: 66-col. 3: 8).

8. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bean et al. in view of Droppo et al. as applied to claim 26 above, and further in view of Payne.

Bean et al. and Droppo et al. are as applied, argued, and disclosed above and incorporated herein.

Claim 29: The Bean et al. combination does not disclose a circuit including a circuit including: a first transistor biased through a resistor to conduct power from the

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fuel cell to a load; a second transistor arranged where if an external battery is inserted, the gate voltage of the first transistor turns the transistor off, preventing connection of the fuel cell to the battery, and the second transistor is biased through a second resistor to conduct power from the battery to the load.

Beans et al. on col. 11: 27-28 disclose, "One skilled in the art can readily choose a power supply 230 without undue experimentation, and Droppo et al. disclose on col. 4: 3-6, "...Of course, many other circuit arrangements could be developed to perform the same functions and the invention is therefore not limited to any particular circuit arrangement..." Therefore, it would have been within the skill of one having ordinary skill in the art of converter circuitry to readily choose a circuit including a circuit including: a first transistor biased through a resistor to conduct power from the fuel cell to a load; a second transistor arranged where if an external battery is inserted, the gate voltage of the first transistor turns the transistor off, preventing connection of the fuel cell to the battery, and the second transistor is biased through a second resistor to conduct power from the battery to the load.

However, Payne in Figure 2 discloses a circuit a circuit including: a first transistor biased through a resistor to conduct power from the fuel cell to a load; a second transistor arranged where if an external battery is inserted, the gate voltage of the first transistor turns the transistor off, preventing connection of the fuel cell to the battery, and the second transistor is biased through a second resistor to conduct power from the battery to the load. Payne also disclose that a variety of other circuit (i.e. linear and switching) topologies can alternatively be employed.

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the circuit of the Bean et al. combination by incorporating the circuit of Payne et al. because Payne teaches a dc/dc converter that would have provided simple over-current protection thereby improving the overall performance of the power supply.

9. Claims 31-33 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bean et al. (6,955,863) in view of Droppo et al. (6,628,011), and further in view of Payne (5,309,082).

Claim 31: Bean et al. in Figures 2, 3A and 11 disclose a hybrid power supply comprising:

a fuel cell (104, 220);

an adapter (100, 202) between the fuel cell (104, 220) and a fuel cartridge (210a) or external battery (102, 210b), the adapter comprising:

a member including appropriate mating fittings (110, 112) to allow the member to connect to a battery (102) or a source of fuel (104) for a fuel cell system for powering an electronic device (101, 240) and;

a switching type DC/DC boost type converter (230) that receives energy from a fuel cell (104, 220) or an external battery connected to the member (col. 3: 33-47, col. 4: 13-35, col. 10: 3-10, and 64-67).

Bean et al. do not disclose a switching type DC/DC boost type converter which is arranged to deliver the energy to a rechargeable cell.

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Droppo et al. in Figures 2-4 disclose a switching type DC/DC boost type converter (14) which is arranged to deliver the energy to a rechargeable cell (25)(col. 2: 28-col. 4: 35). The configuration of the converter is similar to that instantly disclosed, and, therefore, would obviously provide substantially constant current drain from the fuel cell.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified apparatus of Bean et al. by substituting the booster with the booster and rechargeable battery of Droppo et al. because Droppo et al. teach a booster in combination with a rechargeable battery that would have provided a power management system that manages power flow to and from multiple, isolated DC power sources and energy storage devices while delivering high quality alternating power to a load thereby improving the overall energy conversion of the apparatus.

Bean et al. on col. 11: 13-17 disclose a fuel cell sensor. Further, Beans et al. on col. 11: 27-28 disclose, "One skilled in the art can readily choose a power supply 230 without undue experimentation, and Droppo et al. disclose on col. 4: 3-6, "...Of course, many other circuit arrangements could be developed to perform the same functions and the invention is therefore not limited to any particular circuit arrangement..." Therefore, it would have been within the skill of one having ordinary skill in the art of converter circuitry to modify the circuitry of the Bean et al. combination to include a fuel cell sensor/comparator, included in a feed back loop disposed about the DC/DC converter.

However, Payne in Figures 1-3 disclose a DC/DC converter including a feedback control loop about the DC/DC converter and that a variety of other circuit (i.e. linear and switching) topologies can alternatively be employed.

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was to have modified the apparatus of the Bean et al. combination by incorporating the feedback control loop of Payne because Payne teaches a dc/dc converter that would have provided simple over-current protection thereby improving the overall performance of the power supply.

Claim 32: The rejection is as set forth above in claim 31 wherein further the recitation “a fuel cell current sensor/comparator draws a constant current that is about equal to an optimal level of current to draw from the fuel cell to maximize fuel efficiency” has been construed as a functional limitation that adds no additional structure to the hybrid power supply. However, as stated above in claim 31, it would have been within the skill of one having ordinary skill in the art of converter circuitry to modify the circuitry of the Bean et al. combination to include a fuel cell sensor/comparator that provides that claimed function.

Claim 33: Because the hybrid power supply of the Bean et al. combination is structurally similar to that instantly disclosed, it obviously would be configured so that the fuel cell provides just above expected average power consumption for a particular application, and the rechargeable battery providing peak power requirements.

Claim 35: Because the hybrid power supply of the Bean et al. combination is structurally similar to that instantly disclosed, the circuit would obviously deliver an output voltage that corresponds to about 90% charge of the rechargeable cell.

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10. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bean et al. in view of Droppo et al., and further in view of Payne as applied to claim 31 above, and further in view of Amatucci (6,517,972).

Bean et al., Droppo et al., and Payne are as applied, argued, and disclosed above, and incorporated herein.

Claim 34: The Bean et al. combination discloses a hybrid power supply comprising a rechargeable battery (see Droppo et al., col. 3: 23-25) but are silent as to a Li-ion or Li-Polymer rechargeable cell.

Amatucci discloses a hybrid power supply comprising a Li-ion or Li-Polymer rechargeable cell (col. 2: 43-col. 3: 11).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the hybrid power supply of the Bean et al. combination by incorporating the Li-ion or Li-Polymer rechargeable cell of Amatucci because Amatucci teaches a Li-ion or Li-Polymer rechargeable cell that would have been capable of being recharged over numerous cycles to provide reliable power sources for a wide range of electrical utilization devices, and capable of exhibiting high energy density, high power density, and long operative life thereby improving the overall reliability, utilization, life, and performance of the hybrid power supply.

Examiner Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas H. Parsons whose telephone number is (571) 272-1290. The examiner can normally be reached on M-F (7:00-4:30) First Friday Off.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Thomas H Parsons
Examiner
Art Unit 1745


PATRICK JOSEPH RYAN
SUPERVISORY PATENT EXAMINER